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Agricultural Safety Efforts by County Health Departments in Wisconsin

SYNOPSIS

Objective. The authors sought to improve the agriculture safety prevention efforts of county health departments in Wisconsin by examining current programs, staffs' perceptions of the farm safety problem, and the need for new resources.

Methods. A survey instrument was completed by a professional staff member of the local health department in each of Wisconsin's 69 counties.

Results. Usable responses were obtained from 84% of the counties. Forty-five percent of the responding staff members conducted some agricultural safety and health programs, most often health screenings or group meetings conducted collaboratively with county agricultural Extension agents. There were no major differences in county demographics or other service provision variables between staff members who conducted programs and those who did not.

Staff members perceived the largest barriers to better safety as lack of staff time and difficulty getting farmers to attend safety programs. Most failed to place more emphasis on training agricultural workers to permanently correct hazards than on training them to work safely around hazards. However, the staff members ranked safety inspection checklists as the most needed new material and ranked Extension agents and farmers as the most appropriate people to conduct inspections using such checklists.

Conclusion. County public health professionals want more staff time and new materials to increase the effectiveness of their agricultural safety efforts. Encouraging agricultural workers and family members to identify and correct hazards would be a more effective use of staff time than training people to work safely around hazards.

The majority of production agricultural operations in the United States are small farms that employ 10 or fewer workers.¹ The risk of injury and disease for both workers and farm residents may be as much as one order of magnitude higher than the average for all occupations.^{1,2} Approximately 30% of farm residents have no medical insurance (compared with 16% of the general population),^{3,4} partly because they and their families are less likely to have employment-related coverage than workers in any other industry.

Workers in these nearly two million very small businesses are difficult to protect because since 1976 Congress has limited the enforcement of Occupational Safety and Health Administration regulations to production agriculture operations with 11 or more full-time employees.⁵⁻⁷

In 1988, the National Academy of Sciences' Institute of Medicine outlined three core functions for public health agencies at all levels of government: assessment, policy development, and assurance.⁸ In 1990, the Public Health Service set as a national objective increasing to 90% the proportion of people served by local public health departments effectively carrying out these three core functions.⁹ Shortly thereafter, the Centers for Disease Control and Prevention (CDC) established a set of performance measures for 10 desirable public health practices corresponding to the three core functions.¹⁰ In 1994, the Wisconsin legislature adopted new language for state laws regulating local public health agencies, which was patterned after the performance measures.¹¹

Wisconsin's experience in promoting agricultural health has relevance for other states; most states have similar public health, education, and other government infrastructures that serve small business production agriculture.^{8,12,13} Wisconsin's farm ownership patterns and the contribution of production agriculture to the state's economy conform closely to national averages.^{14,15} The crops, livestock, and sizes of agricultural operations in Wisconsin best approximate the traditional agricultural regions of the South, Northeast, and Midwest.¹⁴

Methods

Subjects. In 1992, there were 552 public health nurses in Wisconsin employed by 100 local public health agencies. Sixty-two percent, or 340, worked for county public health departments, and the remainder were employed by municipalities. The distribution of public health nursing staff positions among county health departments reflected the degree of urbanization in the state. Half of all Wisconsin counties had no more than three public health nursing staff members, and 24% had no more than one full-time public health nursing position.

To retain the county as the unit of analysis and to retain comparability between large and small county health agencies, a single questionnaire was mailed to each of Wisconsin's 69 county health departments. The cover of the questionnaire included instructions that it "should be filled out by the public health staff person who is involved with health education of rural and farm families." Respondents were directed to answer questions only in regard to their own

activities and not to summarize all of the activities in their local public health agency.

The belief was that county-based departments were more likely than those at the municipal level to serve members of the traditionally rural production agriculture workforce and their families. The design of the study also placed a priority on retaining the county as the unit of analysis because other important agricultural occupational health resources, such as the University of Wisconsin Cooperative Extension, are organized into county units.

Survey instrument. The survey's objective was to determine the nature and extent of current programming by county public health professionals in the agricultural occupational health area along with their perceptions of farm safety issues and their interest in new resources.

Staff members of the Biological Systems Engineering Department of the University of Wisconsin adapted the most relevant items from questionnaires previously administered to Wisconsin county Extension agents, farmers, and agricultural education instructors.¹⁶ The questionnaire was then reviewed by public health nurses at the National Institute for Occupational Safety and Health and the state Division of Health.¹⁷

Survey procedure. The Dillman mail survey method—cover letters emphasizing social utility and privacy protections and follow-up mail contacts to nonrespondents—was used.^{18,19} The protocol was approved by the University of Wisconsin College of Agricultural and Life Sciences human subjects committee.

Analysis. Data entry and analysis were conducted with noncommercial, general purpose database management and statistics software.²⁰ Statistical tests incorporated Bonferoni corrections for multiple comparisons, and all probabilities reported are significant at the $P < 0.05$ level.

Results

Public health professionals from 58 of 69 county departments returned their questionnaires (84% response rate) (Table 1). The 58 responders were almost entirely female (96%), with a mean age of 44.3 years. Most had been employed in their current position for more than a decade. The majority (84%) had the title of public health nurse, while a minority (14%) were administrators.

General programming in the last year. Asked how they

Training the agricultural work force in hazard recognition and correction appears to be the correct approach.

Table 1. Characteristics of Wisconsin county public health nurses responding to survey on agricultural safety programs, 1992

| Characteristics | All nurses N=58 | Nurses with programs n=26 | Nurses without programs n=32 |
|--|--------------------|------------------------------|---------------------------------|
| Percent female..... | 96.4 | 92.0 | 100 |
| Age | | | |
| Years..... | 44.3 | 44.5 | 44.2 |
| Standard deviation..... | 10.0 | 10.9 | 9.3 |
| Nursing career | | | |
| Years..... | 9.8 | 11.1 | 8.6 |
| Standard deviation..... | 6.5 | 7.4 | 5.8 |
| Job title (percentages) | | | |
| Public health nurse..... | 83.8 | 88.4 | 78.3 |
| Administrator..... | 14.4 | 7.4 | 21.7 |
| Health educator..... | 1.8 | 3.8 | 0 |
| Time spent last year on all county residents | | | |
| Days per nurse..... | 205.9 | 202.0 | 209.0 |
| Standard deviation..... | 89.6 | 104.7 | 76.6 |
| Time spent last year on health for farmers | | | |
| Days per nurse..... | 7.8 | 15.0 | NA |
| Standard deviation..... | 23.6 | 31.20 | NA |
| Time planned next year on health for farmers | | | |
| Days per nurse..... | 9.0 | 16.6 | 1.0 |
| Standard deviation..... | 25.1 | 33.1 | 2.0 |

NA=Not applicable.

spent the approximately 250 days worked in the last year, the county public health professionals reported spending an average of 205.6 days, or 82% of their time, on general public health and prevention programs (Table 1). The general activities occupying the largest proportions of working time were: home health visits (25%), immunizations (19%), and other infectious disease prevention activities (10%).

Agricultural health programming. Almost half of those surveyed said they conducted some activities in the agricultural health and safety area (26 of 58, or 44.8%). For those conducting such programs, efforts averaged 15 days, or 6% of total working time in the last year (Table 1). Statewide, the total county public health professional effort equaled 390 days or 1.56 work years. The large standard deviation associated with amount of time in the last year reflected the influence of three county public health professionals reporting 60, 100, and 125 days per year. The 26 county public health professionals who ran agriculture-related programs planned to increase the time spent on agricultural health and safety modestly in the next year, by an average of 11%.

There were no statistically significant differences in sex, age, length of service, or time spent on public health outreach between county public health professionals who conducted agricultural safety programs and those who did not.

The 26 county public health professionals who conducted agricultural health and safety programs claimed that they spent most of that time in health screenings (31.1%)

(Table 2). The second most important activity was conducting adult group educational programs (16.3%). Little time was spent in illness or injury reporting, assisting others in doing agricultural safety programming, or taking work and occupational health histories.

Nearly all (96%) of the 26 county public health professionals with programs on agricultural health and safety involved county Extension agents or state Extension spe-

Table 2. Agricultural safety efforts conducted by county health departments in Wisconsin, 1992

| Type of activity | Percent |
|--|---------|
| Health screenings..... | 31.1 |
| Adult group meetings..... | 16.3 |
| Attending continuing education..... | 11.1 |
| Youth group meetings..... | 8.7 |
| Answering telephone requests..... | 7.2 |
| Treatment, care, and support of farmers and farm residents..... | 6.0 |
| Hazard inspections of farms and farm residences..... | 3.7 |
| Reading and self study..... | 3.3 |
| Reporting agricultural injuries and diseases..... | 1.3 |
| Assisting others in doing injury and disease programs..... | 0.6 |
| Taking occupational health histories..... | 0.0 |
| Other..... | 10.7 |

Table 3. Perceptions of effectiveness, quality of information, and client interest in safety programs given by county public health staff members, Wisconsin, 1992

| Judgment | Mean rating ^a | Standard deviation |
|---|--------------------------|--------------------|
| Office effectiveness in improving health and safety | | |
| Among farmers | 2.80 | 0.90 |
| Among all county residents | 2.46 | 0.71 |
| Quality of information on hand | | |
| About farm health and safety | 2.98 | 0.98 |
| About general health and safety | 2.54 | 0.98 |
| Interest expressed in health and safety | | |
| By farmers | 2.94 | 0.77 |
| By all county residents | 2.60 | 0.60 |
| Level of health and safety | | |
| Among farmers | 2.84 | 0.42 |
| Among all county residents | 3.17 | 0.50 |

^aOn a scale of 1-5: 1=very low, 2=low, 3=average, 4=high, and 5=very high.

cialists in their programs. One-quarter to one-third of the county public health professionals also involved local health care providers, active or retired farmers, agricultural educators, or emergency medical service personnel.

Perceptions of the farm safety problem. County public health professionals rated their offices as equally effective in improving the health and safety of farmers and of county residents in general (Table 3). Similarly, they rated the quality of information in their offices about farm health and safety topics as equal to the quality of other information they had on hand about general health and safety topics. Finally, interest in safety was rated as being as high among farmers as among county residents in general, although the achieved level of safety was seen as lower among farmers. There were no differences in this group of questionnaire responses between county public health professionals who conducted agricultural safety programs and those who did not.

Overall, the 58 county public health professionals ranked "too many demands on staff time" as the major barrier to better farm health and safety programs. The county public health professionals ranked difficulties in getting farmers to attend activities second, and a need for ideas on how to include safety as part of other programs third. Few county public health professionals ranked a lack of materials or information about injury costs, how improved safety can enhance productivity, or the costs of correcting hazards as important barriers to better agricultural safety and health.

Less than one-quarter of county public health professionals (21%) correctly responded that the agricultural fatality rate in Wisconsin has not changed in the last 20 years. Twenty-nine percent were aware that permanent hazard correction is more effective in the reduction of injuries and diseases than training people to work safely around hazards.

Table 4. How county public health staff members in Wisconsin would allocate a hypothetical local office budget increase for farm safety programs, 1992 survey

| Activities | Percent of new funding |
|---|------------------------|
| Purchase equipment and provide health screenings | 25.4 |
| Conduct adult group meetings | 12.2 |
| Conduct a health and safety fair | 9.2 |
| Attend continuing education classes | 9.3 |
| Train farm residents to inspect for hazards | 8.0 |
| Conduct youth group meetings | 7.3 |
| Provide treatment, care, and support to farm workers and farm residents | 5.5 |
| Answer telephone requests | 5.6 |
| Conduct hazard inspections of farms and farm residences | 4.7 |
| Reading and self study | 4.4 |
| Report agricultural injuries and diseases | 3.2 |
| Assisting others in doing agricultural injury and disease programs | 2.7 |
| Take occupational health histories | 2.0 |
| Needs assessment, in-service education, unsure | 0.5 |

Every county public health professional returning the survey reported wearing seat belts in motor vehicles being driven on public roads. Of the few county public health professionals who worked around tractors, most (63%) did not allow extra riders on tractors. A minority of those who worked around farm machinery reported wearing hearing protectors (40%).

Planning for future activities. When county public health professionals were given a hypothetical local office budget increase to devote solely to agricultural health and safety for the next year, they allocated the largest proportion of resources to providing more health screenings (Table 4). Conducting more adult group educational meetings received the second largest allocation. There was little interest in new allocations for history taking, injury and disease reporting, or assisting others in doing programs. County public health professionals conducting hazard inspections on farms themselves was also a low priority (4% of budget), but training farm residents to inspect for hazards ranked higher (8%), at fifth of 14 choices.

The county public health professionals were most interested in using suppliers of feed, seed, and agricultural chemicals as resource people (44% of county public health professionals interested), followed by active and retired farmers (41%) and college or university experts (34%).

Asked to prioritize the usefulness of new materials and training aids, county public health professionals ranked, in order: inspection forms, training packets, fact sheets, and videotapes (Table 5).

County public health professionals ranked University of

Table 5. Rankings of interest in new materials for farm safety programs by county public health nurses in Wisconsin, 1992 survey

| <i>New material</i> | <i>All nurses</i> | <i>Nurses with programs</i> | <i>Nurses without programs</i> |
|--|-------------------|-----------------------------|--------------------------------|
| Safety inspection checklists for homes and farms | 19.3 | 23.3 | 15.8 |
| Training packets | 13.4 | 12.0 | 14.6 |
| Safety and health fact sheets | 12.5 | 13.3 | 11.7 |
| Safety and health videotapes | 10.3 | 6.0 | 14.0 |
| Safety demonstrations | 6.9 | 9.3 | 4.5 |
| Monthly farm safety tips | 6.9 | 6.7 | 7.0 |
| Health and safety newsletter | 6.5 | 7.3 | 5.8 |
| Health and safety resource directory | 6.5 | 6.7 | 6.4 |
| New University of Wisconsin Extension safety bulletins | 6.5 | 5.3 | 7.6 |
| Buyers guides to farm equipment safety features | 2.8 | 2.0 | 3.5 |
| Short safety and health magazine articles | 1.9 | 2.7 | 1.2 |
| Overheads to use in presentations | 0.9 | 1.3 | 0.6 |
| Other | 5.6 | 4.1 | 7.3 |

NOTE: Rankings were calculated by giving first choice responses triple weight, second choices double weight, and third choices single weight before determining an average score for each response that was then adjusted to a scale of 1 to 100.

Wisconsin Extension agents as their first choice among people who would be best accepted by farmers in the role of outside safety inspector. Other active farmers were ranked second, retired farmers were third, and county public health staff members were ranked fourth.

Discussion

Opinions differ about the most appropriate roles for local health agencies in preventing agricultural injury and disease. There is broad agreement that local public health agencies have an important role in general in identifying and resolving community public health problems.^{8,21} In our study, nearly half of the responding county public health professionals in Wisconsin reported programming that was specific to agricultural occupations (Table 1).

Assessment. In the core function area of assessment, the county public health professionals we surveyed were spending little time on health surveillance (reporting agricultural injuries or diseases, taking occupational histories) (Table 2). Furthermore, most would not choose to make these assessment practices a high priority if additional resources were to become available (Table 3). Given the constraints faced by county health departments, this approach to surveillance of health effects is probably the correct one. Local health agencies rarely have the resources to conduct comprehensive injury and disease surveillance. Instead, state and Federal legislation expanding coverage of the small business agriculture sector by the existing national injury and illness reporting systems is a more logical approach and has been recommended elsewhere.²² However there may be some role for local public health agencies in investigating agricultural health problems.

In Wisconsin in the early 1990s the Grant County Pub-

lic Health Nursing Agency operated a multi-year agricultural injury data collection system in association with local hospitals and clinics. Although total injury numbers in the county-wide surveillance system were too small to allow definitive analyses of trends or etiologic factors, the data were cited in policy development efforts.¹¹ The Federal Occupational Health Nurses in Agricultural Communities program takes a similar approach but goes beyond surveillance to target hazard correction efforts.¹⁷

For hazard surveillance, the picture is somewhat different. As noted, most farms—because they are small agricultural businesses with fewer than 11 employees—are currently not subject to inspections or other enforcement efforts by the Occupational Safety and Health Administration. However, the recognition, identification, and correction of traumatic injury hazards in production agriculture operations is probably the most effective prevention activity now available for reducing job-related morbidity and mortality. Changes in Federal regulatory policy are likely to have a far larger impact than efforts by local governments but are not expected in the foreseeable future. However, there may be a role for local public health agencies in encouraging and assisting self-inspections of hazards and their correction by agricultural operation managers.

In our study, county public health agency staff members ranked hazard inspection checklists for farms and homes as the type of new material they would most like to see developed (Table 5). In the past, public health nurses have played major roles in projects that used voluntary, nonpunitive, advisory inspections to identify and correct injury hazards. Effective injury prevention interventions in homes and child care centers and on playgrounds have used successive onsite audits coupled with specific information about corrective actions and how to apply them.²³⁻²⁶ In our study, county public health staff members were spending little

Table 6. Rankings by county public health nurses in Wisconsin of most appropriate people to do farm safety inspections, 1992 survey

| Person | All nurses | Nurses with programs | Nurses without programs |
|--|------------|----------------------|-------------------------|
| Extension agent | 22.0 | 15.5 | 28.7 |
| Other farmer | 20.1 | 23.2 | 18.6 |
| Retired farmer | 18.6 | 19.7 | 18.6 |
| County public health nurse | 10.4 | 7.7 | 13.2 |
| Farm youth | 9.7 | 14.7 | 5.9 |
| Farm spouse | 8.8 | 7.0 | 7.2 |
| Independent consultant | 1.9 | 1.4 | 2.3 |
| Insurance representative | 1.3 | 1.4 | 1.2 |
| Agricultural Statistics Service researcher | 0.9 | 2.1 | 0.0 |
| Agricultural implement dealer | 0.7 | 1.4 | 0.0 |
| University researcher | 0.3 | 0.7 | 0.0 |
| Other ^a | 5.4 | 5.2 | 4.3 |

^aIncludes unknown due to "limited contact with farmers," those who "have had injury," "ask the farmer," "farmer can be trained to do own," "vocational agriculture teachers," male better accepted.

NOTE: Rankings were calculated by giving first choice responses triple weight, second choices double weight, and third choices single weight before determining an average score for each response that was then adjusted to a scale of 1 to 100.

time conducting onsite hazard inspections (Table 2) and would not change the percentage of their time devoted to inspections even if additional resources were available (Table 4).

Instead, Wisconsin county public health agency staff members ranked active farmers, retired farmers, and Cooperative Extension agents as most likely to be accepted as providers of onsite assistance to farmers (Table 6). County public health professionals felt it was more important to allocate resources to educational programs and to train farmers and farm residents to do inspections than for county staff members themselves to assist on site (Table 4). Although they have a strong interest in seeing injuries avoided, public health personnel are not likely to be as knowledgeable about agricultural technologies, practices, or hazards as farmers or agricultural Extension agents.

Policy development. County public health department staff appeared to be interested in building constituencies, identifying resources, and developing collaborative relationships with a wide range of individuals and groups. Nearly all the county public health professionals who conducted agriculture-related activities collaborated with county Cooperative Extension agents and state specialists. Many also involved local health care providers, school-based agricultural educators, agricultural workforce members, and others.

Local public health agency staff members have also assisted strategic planning by providing input on agricultural health to the statewide Trauma and Injury Prevention Task Force²⁷ and the *Public Health Agenda for the Year 2000*.¹¹ In 1995, a county public health nurse served as the elected head of the Farm Health and Safety Council of Wisconsin. However, the efforts of public health professionals at the state or local level have limited impact. Con-

gress and Federal agencies, with the potential to make the greatest inroads into the agricultural injury and disease problem, appear unlikely to extend safety and health regulations to small business production agriculture.

Assurance. Wisconsin public health staff members spent more time directly providing health screenings to individual farmers and farm residents than on any other activity (Table 2). Although access to health care is vital, research has suggested that better access to care may avoid only a small percentage of premature deaths compared with the reductions possible from prevention programs that modify individual behavior (smoking, diet, exercise) and injury risks.²⁸

Wisconsin public health professionals were also actively educating and informing the public and, more importantly, farm families and agricultural workforce members. Group educational programs were second only to health screenings among agriculture-related activities (Table 2). Nevertheless, traditional safety education programs involving group meetings have been found to be unsuccessful in preventing injury in agriculture and other industries.^{29,30}

Wisconsin public health professionals ranked the need to know more about available resources fifth among 12 barriers to improved agricultural safety and health. On another question, however, county public health professionals rated the information that they had on hand about agricultural health and safety as equal in quality to other information they had about general health and safety (Table 3). County public health professionals also expressed interest in acquiring specific types of materials, including inspection forms, training packets, short fact sheets, and videos (Table 5).

As a result of this survey, the University of Wisconsin has provided each county public health office with a supply of short format materials, videotapes, and other training aids,

including new inspection forms. The university has hired additional statewide agricultural health staff members, who answer telephone inquiries from professionals and the public about agricultural health and safety. They also encourage county health staff to adopt more effective educational techniques. In addition, an article has been published in the state medical journal urging physicians to emphasize the importance of controlling farm hazards during the routine office visits of patients involved in agriculture.³¹

More than half of the county public health staff members we surveyed were doing no work specific to agricultural occupations. Providing more and better materials to county public health professionals may induce more of them to begin agriculture-related activities. Promoting policy development at the Federal level may be a valuable activity but is unlikely to result in regulations affecting most farms. Continued assurance efforts to screen and educate farm workers and their families may also be warranted in view of the barriers to health care experienced in some rural communities; however, injury control and lifestyle change efforts may be able to prevent more premature death than increased access to health care. From the standpoint of preventing work-related injury, better assessment, specifically training the agricultural workforce in hazard recognition and correction, appears to be the most promising approach. Any such efforts will, however, need to recognize that county public health professionals do not want to become inspectors but want farmers themselves to undertake more hazard evaluation and correction.

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